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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,576	04/10/2007	Peter Charnock	APLE 200003US01	3813
27885	7590	10/28/2010	EXAMINER	
FAY SHARPE LLP			WEINER, LAURA S	
1228 Euclid Avenue, 5th Floor				
The Halle Building			ART UNIT	PAPER NUMBER
Cleveland, OH 44115			1726	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/551,576	CHARNOCK ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	/Laura S. Weiner/	1726

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 10 April 2007.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-26 is/are pending in the application.  
 4a) Of the above claim(s) 5-6, 9-10, 14-16 is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-4, 7, 8, 11-13 and 17-26 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____ .                                    |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>10-3-05</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application |
|  | 6) <input type="checkbox"/> Other: _____ .                        |

## DETAILED ACTION

### ***Election/Restrictions***

1. Applicant's election of a fuel cell comprising an ion-conducting polymeric material including Formula (1) cited in claim 4 where E=E'=oxygen and Ar= (iv) cited in claim 4 in the reply filed on 10-12-2010 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Claims 5-6, 9-10, 14-16 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 10-12-2010.

### ***Claim Rejections - 35 USC § 112***

3. Claims 1-4, 7-8, 11-13, 17-19, 20-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is rejected because the claim should cite "material which includes moieties of formula A". It is unclear what is meant by "material which includes moieties of formula".

Claim 3 is rejected because it is unclear if (i), (ii) and (iii) all have to be present or not. It is unclear how claim 3 further limits claim 1, because the limitation (i) phenyl moieties is redundant because all polymeric material have to include a phenyl as shown

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as formula A. It is unclear how claim 3 further limits claim 1, because the limitation (iii) ether and/or thioether moieties is redundant because all polymeric material have to include an oxygen (ether) and/or sulphur (thioether) atom because X is defined as an oxygen and sulphur atom.

Claim 4 is rejected because the claim should cite "material includes a moiety of formula I...and/or a moiety of formula II...and/or a moiety of formula III". It is unclear what is meant by "wherein at least some of the units I, II and/or III are functionalised to provide ion-exchange sites". In addition i is unclear what is meant by "wherein at least some of the units I, II and/or III" because it is unclear what units I, II and III are referring to. It is unclear what is meant by "wherein unit A is a part of units I, II and/or III, wherein the phenyl moieties in units I, II, and/or III" because what is unit A and what is units I, II, III and what is phenyl moieties? There is no antecedent basis for "the phenyl moieties". It is unclear what is meant by "bonded via one or more of its phenyl moieties to adjacent moieties".

Claim 11 is rejected because it is unclear what is meant by "are functionalised with ion-exchange sites".

Claim 12 is rejected because it is unclear what is meant by "which are functionalised with ion-exchange sites are moieties A".

Claim 13, it is unclear what is meant by "where substantially 100 mole% of moieties A are difunctionalised".

Claim 19 cannot depend from claim 1, because claim 19 claims an ion conducting polymeric material and claim 1 claims a polymer electrolyte membrane

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which includes an ion conducting polymeric material.

Claim 20 cannot depend from claim 1, because claim 20 claims a method of making a sulphonated ion conducting polymeric material and claim 1 claims a polymer electrolyte membrane and claims a membrane comprising an ion-conducting polymer material which is not sulphonated. Therefore this claim will be withdrawn in the next office action.

Claim 21 is rejected because there is no antecedent basis for "said conditions for controllably sulphonating the polymeric material" because there is no method step of sulphonating with sulphuric acid". This claim will also be withdrawn in the next office action because the claim depends from claim 20.

Claims 22-23 will be withdrawn in the next office action because the claims depend from claim 20.

Claim 24 is rejected because there is no method step of sulphonation cited in claim 20.

Claim 25 will be withdrawn in the next office action because the claims depend from claim 20.

Claim 26 is rejected because it is unclear what is meant by "use of 99.8-100% sulphuric acid" because no sulfuric acid is cited in claim 20. This claim will be withdrawn in the next office action because the claims depend from claim 20.

### ***Double Patenting***

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with

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37 CFR 3.73(b).

5. Claims 1- 4, 7-8, 11-13, 18-19 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 8-10, 12, of copending Application No. 11/602,186. Although the conflicting claims are not identical, they are not patentably distinct from each other because Application No. 11/602,186 claims in claim 1, a polymer electrolyte membrane or gas diffusion electrode which includes a semi-crystalline copolymer comprising a first unit which includes an ion exchange site; a second crystalline unit and a third unit which is amorphous. Application No. 11/602,186 claims in claim 8, that the copolymer includes a first unit having the formulas IV or V or IV\* or V\* where E and E' represent an oxygen or a sulphur atom and Ar is selected from one of (i)\* and (i)-(x). Application No. 11/602,186 claims in claim 9, that the first unit is sulphonated to provide ion-exchange site and claims in claim 10, that the first unit includes a multi-phenylene moiety or fused ring aromatic moiety which is functionalized to provide the ion-exchange site. Application No. 11/602,186 claims in claim 12, that the second crystalline unit is crystalline. Application No. 11/602,186 claims in claim 17, that the device can be for a fuel cell or a gas diffusion electrode. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

6. Claims 1-4, 7-8, 11-13, 17-19 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-2, 4-19 of U.S.

Patent No. 7,799,465. Although the conflicting claims are not identical, they are not patentably distinct from each other because U.S. Patent No. 7,799,465 claims a fuel cell comprising an ion-conductive polymeric material which includes a first repeat unit having the formula I and second repeat unit of formula II or formula III and where the ion-conductive polymeric material is crystalline. The second repeat unit is sulphonated. U.S. Patent No. 7,799,465 claims in claim 16, that the equivalent weight (EW) of said ion-conducting polymeric material is 300-850 g/mol.

7. Claims 1-4, 7-8, 11-13, 18-19 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-8 of U.S. Patent No. 7,303,830. Although the conflicting claims are not identical, they are not patentably distinct from each other because U.S. Patent No. 7,303,830 claims a fuel cell comprising a polymer electrolyte membrane which includes a semi-crystalline polymer having a level of crystallinity of at least 0.5% and has a moiety of formula I and/or formula II and or formula III where E and E' can be O or sulphur atom. U.S. Patent No. 7,303,830 claims in claim 3 that the polymer is sulfonated.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
- (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1- 4, 8, 11-13, 19, 20-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Helmer-Metzmann et al. (5,362,836).

Helmer-Metzmann et al. teaches polymer electrolytes comprising a sulfonated aromatic polyether ketone of the formula II. The polymer electrolyte is prepared by dissolving an aromatic polyether ketone in 94-97 wt% sulfuric acid and adding a sulfonating agent.

Helmer-Metzmann et al. teaches in columns 3-4, that the sulfonation is carried out from 30-80 degrees C and typical reaction times are from 1-8 hours and that the H<sub>2</sub>SO<sub>4</sub> concentration is from 98-99.5 wt%.

10. Claims 1-4, 7-8, 11-13, 17-19 are rejected under 35 U.S.C. 102(a) as being anticipated by Devine et al. (WO 03/028139).

Devine et al. teaches a fuel cell comprising an ion-conductive polymeric material which includes a first repeat unit having the formula I and second repeat unit of formula II or formula III and where the ion-conductive polymeric material is crystalline. The

second repeat unit is sulphonated. Devine et al. teaches in claim 16, that the equivalent weight (EW) of said ion-conducting polymeric material is 300-850 g/mol.

11. Claims 1-4, 7-8, 11-13, 18-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Andrews et al. (WO 02/075835).

Andrews et al. claims a fuel cell comprising a polymer electrolyte membrane which includes a semi-crystalline polymer having a level of crystallinity of at least 0.5% and has a moiety of formula I and/or formula II and or formula III where E and E' can be O or sulphur atom. Andrews et al. claims in claim 5 that the polymer is sulfonated.

12 . Claims 1-4, 7-8, 11-13, 17-19, 20-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Charnock et al. (6,902,801).

Charnock et al. teaches a fuel comprising a polymer electrolyte composite membrane. Charnock et al. teaches in columns 25-26, a composite membrane comprising an ion-conductive polymer having a moiety of formula I and/or Formula II and/or Formula III where E and E' can be O or sulfur and Ar is selected from moieties (i)\* or (i)-(x). Charnock et al. teaches that the ion-conductive polymer has the repeat unit of formulas IV, V, IV\* or V\*. Charnock et al. teaches in column 30, that the ion-conductive polymer has an equivalent weight (EW) of less than 500 g/mol. Charnock et al. teaches in columns 21-22, Example 6, that the polymers of Examples 1-5 were sulphonated by stirring each polymer in 98% sulphuric acid for 21 hours at 50 degrees C.

13. Claims 1-4, 7-8, 11-13, 18-19, 20-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Bridges et al. (US 2004/0224202).

Bridges et al. teaches a fuel comprising an ion-exchange material for a polymer electrolyte membrane or gas diffusion electrode. Bridges et al. teaches in columns 15-16, that the polymer electrolyte membrane or gas diffusion electrodes includes a copolymer having the formula IV or V or IV\* or V where E and E' can be O or sulfur and Ar is selected from moieties (i)\* or (i)-(x). Bridges et al. teaches that the a first unit is sulphonated to provide ion exchange site and that the second unit of formula IV or IV\* is crystalline. Bridges et al. teaches in columns 10-11, Example 7, that the polymers of Examples 1-6 were sulphonated by stirring each polymer in 98% sulphuric acid for 21 hours at 50 degrees C.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to /Laura S. Weiner/ whose telephone number is 571-272-1294. The examiner can normally be reached on M-H (6:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Laura S Weiner/  
Primary Examiner  
Art Unit 1726

October 26, 2010